

NOTES ON THE GENUS *DOLICHOPUS* (DIPTERA,
DOLICHOPODIDAE).PAPER 2.¹

BY GEORGE STEYSKAL, Detroit, Michigan.

In the first note of the series I presented epigamic observations on *Dolichopus omnivagus* V. D. Since Aldrich (Van Duzee, Cole and Aldrich, 1921) brought together the then known facts relating to the courtship of *Dolichopus* species, including the five species *D. tenuipes* Ald., *D. crenatus* O. S., *D. plumipes* Scop., *D. aldrichii* Wheeler and *D. longimanus* Lw., the only additional observations of which I am aware were recorded by Gruhl (1924), who included notes on *D. unguatus* L., *D. pennatus* Mg., *D. plumipes* Scop. and *D. popularis* Wd. I am able at this time to add *D. eudactylus* Lw., *D. ovatus* Lw., *D. setifer* Lw., *D. albicoxa* Ald., *D. gratus* Lw. and *D. latipes* Lw.

Little physical description is given here inasmuch as full descriptions of the American species are easily available in Van Duzee, Cole and Aldrich (1921).

D. eudactylus Lw. On June 5, 1938, I was able to observe this species on leaves of underbrush in the wood back of my house in Detroit, Michigan. The majority of the flies were males, each occupying a sunny spot on the leaves, once in a while moving to a different spot. If that spot were already occupied by another male the intruder would frequently assume the attitude described below, but more frequently would be chased away after a brief aerial skirmish.

The male of *eudactylus* faced very closely the object (male or female) of his attentions and quickly assumed a reared-up posture on his two hind pairs of legs with his hypopygium almost touching the leaf on which he was standing. The hypopygium was lowered away from the abdomen somewhat and the wings were held at approximately a 30° angle to each side of the abdomen, twisted so that their lower edges were turned a little forward. The fore legs were held extended widely laterally with the tarsi curved forward a little. The fly held this position for a very short time and then attempted to mount the other fly from the rear. No successful attempts at mounting were observed.

On June 4, 1939, the above observations were confirmed and an apparently successful union was watched. The union continued for

¹ For Paper 1 see this Bulletin, vol. 33, pp. 193-194 (1938).

thirty seconds, during which time the female made a few weak attempts to disengage herself. The pair was finally separated by the persistent attentions of a second male and all three flies flew away.

Eudactylus was again observed in the same locality on June 8, 1941. The flies, abundant enough, seemed to be only males. There was little epigamic exhibition, the flies usually sitting calmly on a leaf. They would, however, occasionally fly about. If one alighted near another the epigamic display was exhibited with some difference from that described above. The fore legs were stretched very widely apart and the fly took a very close position, less than his own length from the other fly. The protagonist would quickly jump upon the second fly and the result was that the second fly would be driven off. Sometimes a fly would go about "knocking off" three or four other flies in succession. The display in this case seemed to be one of threat only.

By June 30, 1941, *eudactylus* was decidedly less numerous and on August 17 there was none to be found.

D. ovatus Lw. was watched on October 12, 1940, on small "mud flats" on the banks of the River Rouge near my home in Detroit. In midsummer other species predominated, but on October 12 there were many *ovatus* on the clayey banks of the river enjoying the warm sunny afternoon on fallen leaves lying on or very near the water. The only other *Dolichopus* taken at the time was a single male *albiciliatus* Lw. The *ovatus* were never long in one spot, stopping only to preen themselves or to "nose" about in the substratum. When one male approached within an inch or so of another there would be a brief tumbling flight, one of the flies usually alighting in the same spot whence the fracas started. Females apparently did not resent the close approach of others of the same sex.

Occasionally a male would notice a female and hover for about a second at a distance of from two to six inches from her and about two inches above the ground. He would sometimes dart a few inches to one side of the female, or even behind her, and hover a short while in the new position. Sometimes he very rapidly changed position three or four times, but most frequently would hover in but one position and then dart down and attempt to mount the female. Often he would bounce up and down on her from once to as many as ten times at an angle of about 70° from the rear substratum, rising about an inch above her each time, and then rest on her for a short while. Sometimes the hovering would be omitted and the

bouncing commenced immediately as the male approached, in which case he might hover in one or two positions afterward and then attempt to copulate, with or without bouncing again. The females apparently paid not the slightest attention to these antics and one female continued to suck placidly at a prey while a male assiduously played his game for perhaps fifteen seconds before giving up and flying away.

D. setifer Lw. This species was abundant at the edge of a mill pond on a branch of the Huron River in Sharon Township, Washtenaw County, Michigan, on June 30, 1940. The flies, females in large preponderance, were on partly submerged debris blown to the shore, including yellow pond lily (*Nymphaea advena*) remains cut from the other side of the pond. This species is one of the few with a dark spot at the apex of the wing in the male. The male stood immediately *behind* the female, reared up on all sixes, his head just above the tip of the female's wings (the scales on the lower part of the back of the head in the male are particularly broad and bright white in this species). He rapidly flashed his wings sidewise in very quick succession, apparently first one wing and then the other, but the process was so rapid that it was difficult to tell whether the wings may not have been flashed out simultaneously. This was done for a short time and then the fly attempted to copulate. The females observed would thereupon move away. The hind tibiae and tarsi of the male of the species are dark and heavily bristled, but no apparent effort was made to display them.

On finding *setifer* plentiful on mud flats at the water's edge on the Rouge River in Detroit, Michigan, on July 4, 1941, the opportunity again presented itself for observing this species during the early afternoon. The females were again in preponderance and could be easily recognized among other *Dolichopus* by their size and reddish glint. While the females were "nosing" about at the extreme edge of the water, the males seemed to spend most of their time hovering from side to side in rapid flight a short distance above or a little before the females. This action is described as hovering since the insect remains facing the female and merely oscillates laterally. The length of the oscillation varied from about two to six inches, usually four. If the female made a short flight the male would follow and resume his oscillatory hovering. Sometimes he would suddenly attempt to copulate, but never with any success.

Especial effort was made to observe the wing-flashing as noted in Sharon Township, but none was seen. Inasmuch as the sun was bright and the air quite warm I decided to watch this species again on the following morning.

On the morning of July fifth another trip was made down to the river at about nine-thirty o'clock, at which time the temperature was about 70° F. and dew was still on the vegetation. This time the flies did not keep so close to the water's edge, but many were found on nearby vegetation (*Sagittaria*, *Polygonum* and grasses).

The hovering was again observed, but this time after a little hovering the males were seen several times to take the above described posture behind the female and assiduously flash their wings several times before the females compelled them to stop by moving away. It here seemed that the flashing was alternate.

Setifer was still abundant at the River Rouge on August 17, 1941, but no observations were made.

D. albicoxa Aldrich was first observed on fallen leaves on the surface of a cement pool in my yard at Detroit on June 24, 1939. The male hovered an inch or so above the pool a short distance before the female, occasionally dipping to touch the water.

At the time the above observations on *setifer* were made (July 5, 1941) a few *albicoxa* were also seen. The male hovered stationary about four inches before the female and about two inches above her. The hind legs were held high, curved a little above the level of the abdomen, while the middle and fore legs were hanging down, the fore legs with their black tarsal pads held close together. No dipping was observed, but the males would occasionally shift position a little from one side to the other.

D. gratus Lw. On highway M-60 between Burlington and Tekonsha, Michigan, a small branch of the St. Joseph River enters a virgin beech-elm forest with an undergrowth comprised largely of prickly ash (*Xanthoxylum americanum*). Here on June 1, 1941, *gratus* was found at the edge of the stream. The male was seen to chase the female over the water, occasionally making a jab at her.

The species was also abundant in a beech woods at Schoolcraft and Levan Roads, Wayne County, Michigan, on June 15, 1941. The undergrowth here was largely *Benzoin*, *Sassafras* and *Rubus*. It was not possible to make observations.

By June 30, 1941, *gratus* had become abundant in my garden at Detroit, which is in a small woods containing several beech trees. One of the favorite resting places for the males was the white portions of the leaves of a variegated plantain-lily (*Hosta* sp., cultivated). They seemed to have no definite epigamic display but were very active, continually chasing each other about. Several times one was seen standing closely behind another, reared up and apparently attempting copulation. A few days later, on July 4,

the flies were seen in a concrete pool in my garden. The pool was unkempt, many dead leaves having been allowed to accumulate in it, and the few inches of water in it formed of it a typical woodland pool. Here *gratus* was occupied in chasing each other about at a distance of an inch or less above the water. Frequently one was seen in close pursuit behind another, once in a while making a jab at it. The flies would usually alight on a leaf lying on the surface of the water but seemed to have no objection to alighting on the water if necessary.

It may be remarked that *D. gratus* Lw., *D. calcaratus* Aldrich and *D. mercieri* Parent are doubtfully even varietally distinct.

D. latipes Lw. Early in the morning of August 17, 1941, this species was found in numbers on the muddy banks of the River Rouge in Detroit, the same locality where the observations were made on *D. setifer*, *albicoxa* and *ovatus*. There had been much rain during the previous few days and a heavy dew covered the vegetation along the river. *Latipes* seemed to prefer the shade among the arrowhead and smartweed. Probably due to the cool temperature (about 65° F.) the flies were easy to observe as they did not move as rapidly as the other species previously observed. They were quite gregarious, a score of individuals sometimes being seen in a space about six inches square.

This species has the middle tarsi broad and black and is related to *D. aldrichii*, whose epigamy has been described by Aldrich (Van Duzee, Cole and Aldrich, 1921, p. 4).

The male stealthily approached on foot to within an inch of the female, at each step lifting and extending the middle legs and curving inward the blackened terminal joints of the middle tarsi. In this action he reminded one of a cat treading a wet surface or of a prancing horse. Once he had approached either by flight or by stealth to about a half inch of the female he stood still in a normal position, lifted his middle legs, usually alternately but often simultaneously, and extended them outward and a little forward, flexing and extending the tarsi and gesticulating with them in a quite varied manner. Frequently two or three males would stand about a female wildly gesticulating with their extended middle feet.

After gesticulating a while the male would usually attempt to mount the female. Then she would fly off without him, as she often did before he finished his leg-waving.

LITERATURE CITED.

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A CURIOUS HABIT OF AN EMPIDID FLY;
FURTHER NOTES.

BY GEO. STEYSKAL, Detroit, Mich.

When the first observations on *Rhamphomyia fumosa* Loew were made during 1939 and 1940 (reported in this Bulletin, vol. XXXVI, p. 117; 1941), no males were seen in the vicinity of the swarming females. In Detroit from June 8 until June 26, 1941, both sexes of *fumosa* were more abundant than before, and on June 16, 17 and 26 swarms were observed at dusk. This time males were seen.

There was a large swarm in my garden on all three dates next a number of large royal ferns (*Osmunda regalis* L.), a few yards from the spot where they were seen in the previous seasons. The swarm certainly included over a hundred females. Occasionally a pair would be noticed flying somewhat more rapidly than single females. They would often separate as much as two yards from the swarm and would usually fly at a little higher elevation. The pairs were never seen to alight although single females were seen to do so in several instances.

Each time a mating pair was swept into the net a prey was found in a dead or moribund condition. Whether or not the female had possession of the prey could not be determined since by the time the net could be held up for examination the sexes had separated and were actively trying to escape. The prey was as follows. June 16: 2 small caddis flies, 2 small crane flies (*Dicranomyia liberta* O. S.), 4 gnats (*Chironomus* spp.); June 17: 7 *Chironomus* spp., 5 *Dicranomyia liberta*, 2 mosquitoes (*Aedes stimulans* Wlk., *Culex* sp.), 1 small *Rhamphomyia* sp.; June 26: 4 *Chironomus* spp., 3 *Dicranomyia liberta*, 1 small caddis fly.